

SEQUENCE LISTING

<110> ReproCELL, Inc.

5 <120> EXPANSION AGENTS FOR STEM CELLS

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<140> none

10 <141> 2002-11-08

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<170> PatentIn version 3.1

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	Gln Met Gln Val Leu Tyr Gly Gln His Phe Pro Ile Glu Val Arg His	
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10	Tyr Leu Ala Gln Trp Ile Glu Ser Gln Pro Trp Asp Ala Ile Asp Leu	
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	gac aat ccc cag gac aga gcc caa gcc acc cag ctc ctg gag ggc ctg	192
	Asp Asn Pro Gln Asp Arg Ala Gln Ala Thr Gln Leu Leu Glu Gly Leu	
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	gtg cag gag ctg cag aag aag gcg gag cac cag gtg ggg gaa gat ggg	240
	Val Gln Glu Leu Gln Lys Lys Ala Glu His Gln Val Gly Glu Asp Gly	
	65 70 75 80	
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	ttt tta ctg aag atc aag ctg ggg cac tac gcc acg cag ctc cag aaa	288
	Phe Leu Leu Lys Ile Lys Leu Gly His Tyr Ala Thr Gln Leu Gln Lys	
	85 90 95	
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	Thr Tyr Asp Arg Cys Pro Leu Glu Leu Val Arg Cys Ile Arg His Ile	

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	Glu Leu Lys Lys Leu Gln Gln Thr Gln Glu Tyr Phe Ile Ile Gln Tyr			
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Ile Pro Gly Pro Val Glu Glu Met Leu Ala Glu Val Asn Ala Thr Ile

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Tyr Leu Ala Gln Trp Ile Glu Ser Gln Pro Trp Asp Ala Ile Asp Leu

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35

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45

Asp Asn Pro Gln Asp Arg Ala Gln Ala Thr Gln Leu Leu Glu Gly Leu

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Val Gln Glu Leu Gln Lys Lys Ala Glu His Gln Val Gly Glu Asp Gly

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70

75

80

20

Phe Leu Leu Lys Ile Lys Leu Gly His Tyr Ala Thr Gln Leu Gln Lys

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90

95

25

Thr Tyr Asp Arg Cys Pro Leu Glu Leu Val Arg Cys Ile Arg His Ile

100

105

110

Leu Tyr Asn Glu Gln Arg Leu Val Arg Glu Ala Asn Asn Cys Ser Ser

5

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Pro Ala Gly Ile Leu Val Asp Ala Met Ser Gln Lys His Leu Gln Ile

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Asn Gln Thr Phe Glu Glu Leu Arg Leu Val Thr Gln Asp Thr Glu Asn

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170

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190

Ser Pro Gln Glu Arg Leu Ser Arg Glu Thr Ala Leu Gln Gln Lys Gln

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Val Ser Leu Glu Ala Trp Leu Gln Arg Glu Ala Gln Thr Leu Gln Gln

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Tyr Arg Val Glu Leu Ala Glu Lys His Gln Lys Thr Leu Gln Leu Leu

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235

240

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Arg Arg Gln Gln Leu Ala Gly Asn Gly Gly Pro Pro Glu Gly Ser Leu

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Arg Leu Leu Val Gly Gly Lys Leu Asn Val His Met Asn Pro Pro Gln

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Cys Val Met Glu Tyr His Gln Ala Thr Gly Thr Leu Ser Ala His Phe

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Glu Ser Val Thr Glu Glu Lys Phe Thr Val Leu Phe Glu Ser Gln Phe

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Ser Val Gly Ser Asn Glu Leu Val Phe Gln Val Lys Thr Leu Ser Leu

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Pro Val Val Val Ile Val His Gly Ser Gln Asp His Asn Ala Thr Ala

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Thr Val Leu Trp Asp Asn Ala Phe Ala Glu Pro Gly Arg Val Pro Phe

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Asn Leu Val Phe Leu Ala Gln Lys Leu Phe Asn Asn Ser Ser Ser His

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560

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570

575

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Val Met Glu Val Leu Lys Lys His His Lys Pro His Trp Asn Asp Gly

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585

590

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Ala Ile Leu Gly Phe Val Asn Lys Gln Gln Ala His Asp Leu Leu Ile

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655

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665

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680

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700

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Gln Met Gln Ala Leu Tyr Gly Gln His Phe Pro Ile Glu Val Arg His

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	Thr Tyr Asp Arg Cys Pro Met Glu Leu Val Arg Cys Ile Arg His Ile	
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	Pro Ala Gly Ser Leu Ala Asp Ala Met Ser Gln Lys His Leu Gln Ile	
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565 570 575

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Val Met Glu Val Leu Lys Lys His Leu Lys Pro His Trp Asn Asp Gly
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10	tgg aat ctg atg cct ttt acc acc aga gac ttc tcc att cgg tcc cta			1968
	Trp Asn Leu Met Pro Phe Thr Thr Arg Asp Phe Ser Ile Arg Ser Leu			
	645	650	655	
15	gcc gac cgc ttg gga gac ttg aat tac ctt atc tac gtg ttt cct gat			2016
	Ala Asp Arg Leu Gly Asp Leu Asn Tyr Leu Ile Tyr Val Phe Pro Asp			
	660	665	670	
	cgg cca aaa gat gaa gta tac tcc aaa tac tac aca cca gtt ccc tgc			2064
20	Arg Pro Lys Asp Glu Val Tyr Ser Lys Tyr Tyr Thr Pro Val Pro Cys			
	675	680	685	
	gag tct gct act gct aaa gct gtt gat gga tac gtg aag cca cag atc			2112
	Glu Ser Ala Thr Ala Lys Ala Val Asp Gly Tyr Val Lys Pro Gln Ile			
25	690	695	700	

aag caa gtg gtc cct gag ttt gtg aac gca tct gca gat gcc ggg ggc 2160
Lys Gln Val Val Pro Glu Phe Val Asn Ala Ser Ala Asp Ala Gly Gly
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5 ggc agc gcc acg tac atg gac cag gcc ccc tcc cca gct gtg tgt ccc 2208
Gly Ser Ala Thr Tyr Met Asp Gln Ala Pro Ser Pro Ala Val Cys Pro
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cag gct cac tat aac atg tac cca cag aac cct gac tca gtc ctt gac 2256
10 Gln Ala His Tyr Asn Met Tyr Pro Gln Asn Pro Asp Ser Val Leu Asp
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acc gat ggg gac ttc gat ctg gag gac aca atg gac gta gcg cgg cgt 2304
Thr Asp Gly Asp Phe Asp Leu Glu Asp Thr Met Asp Val Ala Arg Arg
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gtg gag gag ctc ctg ggc cgg cca atg gac agt cag tgg atc ccg cac 2352
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Tyr Leu Ser Gln Trp Ile Glu Ser Gln Ala Trp Asp Ser Val Asp Leu

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20 Asp Asn Pro Gln Glu Asn Ile Lys Ala Thr Gln Leu Leu Glu Gly Leu

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Val Gln Glu Leu Gln Lys Lys Ala Glu His Gln Val Gly Glu Asp Gly

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75

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Phe Leu Leu Lys Ile Lys Leu Gly His Tyr Ala Thr Gln Leu Gln Asn

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90

95

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Thr Tyr Asp Arg Cys Pro Met Glu Leu Val Arg Cys Ile Arg His Ile

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110

10 Leu Tyr Asn Glu Gln Arg Leu Val Arg Glu Ala Asn Asn Gly Ser Ser

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120

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Pro Ala Gly Ser Leu Ala Asp Ala Met Ser Gln Lys His Leu Gln Ile

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Asn Gln Thr Phe Glu Glu Leu Arg Leu Val Thr Gln Asp Thr Glu Asn

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Glu Leu Lys Lys Leu Gln Gln Thr Gln Glu Tyr Phe Ile Ile Gln Tyr

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Gln Glu Ser Leu Arg Ile Gln Ala Gln Phe Gly Pro Leu Ala Gln Leu

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Ser Pro Gln Glu Arg Leu Ser Arg Glu Thr Ala Leu Gln Gln Lys Gln

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Val Ser Leu Glu Ala Trp Leu Gln Arg Glu Ala Gln Thr Leu Gln Gln

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Tyr Arg Val Glu Leu Ala Glu Lys His Gln Lys Thr Leu Gln Leu Leu

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Arg Lys Gln Gln Thr Ile Ile Leu Asp Asp Glu Leu Ile Gln Trp Lys

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20 Arg Arg Gln Gln Leu Ala Gly Asn Gly Gly Pro Pro Glu Gly Ser Leu

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Asp Val Leu Gln Ser Trp Cys Glu Lys Leu Ala Glu Ile Ile Trp Gln

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Asn Arg Gln Gln Ile Arg Arg Ala Glu His Leu Cys Gln Gln Leu Pro

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Ile Pro Gly Pro Val Glu Glu Met Leu Ala Glu Val Asn Ala Thr Ile

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315

320

10 Thr Asp Ile Ile Ser Ala Leu Val Thr Ser Thr Phe Ile Ile Glu Lys

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Gln Pro Pro Gln Val Leu Lys Thr Gln Thr Lys Phe Ala Ala Thr Val

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Arg Leu Leu Val Gly Gly Lys Leu Asn Val His Met Asn Pro Pro Gln

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Val Lys Ala Thr Ile Ile Ser Glu Gln Gln Ala Lys Ser Leu Leu Lys

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Cys Val Met Glu Tyr His Gln Ala Thr Gly Thr Leu Ser Ala His Phe

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Arg Asn Met Ser Leu Lys Arg Ile Lys Arg Ser Asp Arg Arg Gly Ala

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Glu Ser Val Thr Glu Glu Lys Phe Thr Ile Leu Phe Glu Ser Gln Phe

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Ser Val Gly Gly Asn Glu Leu Val Phe Gln Val Lys Thr Leu Ser Leu

450 455 460

20 Pro Val Val Val Ile Val His Gly Ser Gln Asp Asn Asn Ala Thr Ala

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Thr Val Leu Trp Asp Asn Ala Phe Ala Glu Pro Gly Arg Val Pro Phe

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Ala Val Pro Asp Lys Val Leu Trp Pro Gln Leu Cys Glu Ala Leu Asn

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Leu Glu Asp Tyr Ser Gly Leu Ser Val Ser Trp Ser Gln Phe Asn Arg

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Glu Asn Leu Pro Gly Arg Asn Tyr Thr Phe Trp Gln Trp Phe Asp Gly

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Val Met Glu Val Leu Lys Lys His Leu Lys Pro His Trp Asn Asp Gly

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Ala Ile Leu Gly Phe Val Asn Lys Gln Gln Ala His Asp Leu Leu Ile

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Gly Gly Ile Thr Ile Ala Trp Lys Phe Asp Ser Gln Glu Arg Met Phe

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Trp Asn Leu Met Pro Phe Thr Thr Arg Asp Phe Ser Ile Arg Ser Leu

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Ala Asp Arg Leu Gly Asp Leu Asn Tyr Leu Ile Tyr Val Phe Pro Asp

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20 Arg Pro Lys Asp Glu Val Tyr Ser Lys Tyr Tyr Thr Pro Val Pro Cys

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680

685

Glu Ser Ala Thr Ala Lys Ala Val Asp Gly Tyr Val Lys Pro Gln Ile

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695

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Lys Gln Val Val Pro Glu Phe Val Asn Ala Ser Ala Asp Ala Gly Gly

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710

715

720

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Gly Ser Ala Thr Tyr Met Asp Gln Ala Pro Ser Pro Ala Val Cys Pro

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730

735

10 Gln Ala His Tyr Asn Met Tyr Pro Gln Asn Pro Asp Ser Val Leu Asp

740

745

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Thr Asp Gly Asp Phe Asp Leu Glu Asp Thr Met Asp Val Ala Arg Arg

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Gln Met Gln Val Leu Tyr Gly Gln His Phe Pro Ile Glu Val Arg His

20 25 30

tac ctg gcc cag tgg atc gag agc cag ccg tgg gat gct att gac ttg 144

20 Tyr Leu Ala Gln Trp Ile Glu Ser Gln Pro Trp Asp Ala Ile Asp Leu

35 40 45

gat aat ccc cag gac cga ggt cag gcc acc caa ctc ctg gag ggc ctg 192

Asp Asn Pro Gln Asp Arg Gly Gln Ala Thr Gln Leu Leu Glu Gly Leu

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	gtg cag gag ctg cag aag aag gcg gag cac cag gtg ggg gaa gat ggg	240
	Val Gln Glu Leu Gln Lys Lys Ala Glu His Gln Val Gly Glu Asp Gly	
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5	ttt ttg ctg aag atc aag ctg ggg cac tat gcc aca cag ctc cag aac	288
	Phe Leu Leu Lys Ile Lys Leu Gly His Tyr Ala Thr Gln Leu Gln Asn	
	85 90 95	
	acg tat gac cgc tgt ccc atg gag ctg gtt cgc tgt atc cgt cac att	336
10	Thr Tyr Asp Arg Cys Pro Met Glu Leu Val Arg Cys Ile Arg His Ile	
	100 105 110	
	ctg tac aac gaa cag agg ctg gtt cgc gaa gcc aac aat tgc agc tcc	384
	Leu Tyr Asn Glu Gln Arg Leu Val Arg Glu Ala Asn Asn Cys Ser Ser	
15	115 120 125	
	cct gct ggt gtc ctg gtt gac gcc atg tcc cag aag cac ctt cag atc	432
	Pro Ala Gly Val Leu Val Asp Ala Met Ser Gln Lys His Leu Gln Ile	
	130 135 140	
20	aac caa agg ttt gag gag ctg cgc ctg atc aca cag gac acg gag aac	480
	Asn Gln Arg Phe Glu Glu Leu Arg Leu Ile Thr Gln Asp Thr Glu Asn	
	145 150 155 160	
25	gag ctg aag aag ctg cag cag acc caa gag tac ttc atc atc cag tac	528
	Glu Leu Lys Lys Leu Gln Gln Thr Gln Glu Tyr Phe Ile Ile Gln Tyr	

	165	170	175	
	cag gag agc ctg cgg atc caa gct cag ttt gcc cag ctg ggc cag ctg			576
	Gln Glu Ser Leu Arg Ile Gln Ala Gln Phe Ala Gln Leu Gly Gln Leu			
5	180	185	190	
	aac ccc cag gag cgc atg agc agg gag acg gcc ctc cag cag aag caa			624
	Asn Pro Gln Glu Arg Met Ser Arg Glu Thr Ala Leu Gln Gln Lys Gln			
	195	200	205	
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	gtg tcc ctg gag acc tgg ctg cag cga gag gca cag aca ctg cag cag			672
	Val Ser Leu Glu Thr Trp Leu Gln Arg Glu Ala Gln Thr Leu Gln Gln			
	210	215	220	
	tac cga gtg gag ctg gct gag aag cac cag aag acc ctg cag ctg ctg			720
15	Tyr Arg Val Glu Leu Ala Glu Lys His Gln Lys Thr Leu Gln Leu Leu			
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	cgg aag cag cag acc atc atc ctg gac gac gag ctg atc cag tgg aag			768
20	Arg Lys Gln Gln Thr Ile Ile Leu Asp Asp Glu Leu Ile Gln Trp Lys			
	245	250	255	
	cgg aga cag cag ctg gcc ggg aac ggg ggt ccc ccc gag ggc agc ctg			816
	Arg Arg Gln Gln Leu Ala Gly Asn Gly Gly Pro Pro Glu Gly Ser Leu			
25	260	265	270	

	gac gtg ctg cag tcc tgg tgt gag aag ctg gcc gag atc atc tgg cag	864
	Asp Val Leu Gln Ser Trp Cys Glu Lys Leu Ala Glu Ile Ile Trp Gln	
	275 280 285	
5	aac cgg cag cag atc cgc agg gct gag cac ctg tgc cag cag ctg ccc	912
	Asn Arg Gln Gln Ile Arg Arg Ala Glu His Leu Cys Gln Gln Leu Pro	
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	atc cca ggc ccc gtg gag gag atg ctg gct gag gtc aac gcc acc atc	960
10	Ile Pro Gly Pro Val Glu Glu Met Leu Ala Glu Val Asn Ala Thr Ile	
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	acg gac atc atc tca gct ctg gtc acc agc acg ttc atc atc gag aag	1008
	Thr Asp Ile Ile Ser Ala Leu Val Thr Ser Thr Phe Ile Ile Glu Lys	
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	cag cct cct cag gtc ctg aag acc cag acc aag ttt gcg gcc acc gtg	1056
	Gln Pro Pro Gln Val Leu Lys Thr Gln Thr Lys Phe Ala Ala Thr Val	
	340 345 350	
20	cgc ctg ctg gtg ggg gga aag ctg aat gtg cac atg aac ccc ccg cag	1104
	Arg Leu Leu Val Gly Gly Lys Leu Asn Val His Met Asn Pro Pro Gln	
	355 360 365	
25	gtg aag gcg acc atc atc agc gag cag cag gcc aag tcc ctg ctc aag	1152
	Val Lys Ala Thr Ile Ile Ser Glu Gln Gln Ala Lys Ser Leu Leu Lys	

	370	375	380	
	aat gag aac acc cgc aat gag tgc agc ggc gag atc ctg aac aac tgt			1200
	Asn Glu Asn Thr Arg Asn Glu Cys Ser Gly Glu Ile Leu Asn Asn Cys			
5	385	390	395	400
	tgc gtc atg gag tac cac cag gcc act ggc acg ctc agc gcc cac ttc			1248
	Cys Val Met Glu Tyr His Gln Ala Thr Gly Thr Leu Ser Ala His Phe			
		405	410	415
10	aga aac atg tca ctg aaa aga atc aag cgc gcc gac agg cgt ggt gca			1296
	Arg Asn Met Ser Leu Lys Arg Ile Lys Arg Ala Asp Arg Arg Gly Ala			
		420	425	430
15	gag tcg gtg acg gag gag aag ttc aca gtc ctg ttt gag tct cag ttc			1344
	Glu Ser Val Thr Glu Glu Lys Phe Thr Val Leu Phe Glu Ser Gln Phe			
		435	440	445
	agc gtt ggc agc aac gag ctg gtg ttc cag gtg aag acc ctg tcc ctc			1392
20	Ser Val Gly Ser Asn Glu Leu Val Phe Gln Val Lys Thr Leu Ser Leu			
		450	455	460
	cct gtg gtc gtt atc gtc cat ggc agc cag gac cac aat gct act gcc			1440
	Pro Val Val Val Ile Val His Gly Ser Gln Asp His Asn Ala Thr Ala			
25	465	470	475	480

	acc gtg ctg tgg gac aat gcc ttt gct gag ccg ggc agg gtg cca ttt	1488
	Thr Val Leu Trp Asp Asn Ala Phe Ala Glu Pro Gly Arg Val Pro Phe	
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5	gct gtg cct gac aag gtg ctg tgg ccg cag ctg tgt gaa gcg ctc aac	1536
	Ala Val Pro Asp Lys Val Leu Trp Pro Gln Leu Cys Glu Ala Leu Asn	
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	atg aaa ttc aag gct gaa gta cag agc aac cgg ggc ttg acc aaa gag	1584
10	Met Lys Phe Lys Ala Glu Val Gln Ser Asn Arg Gly Leu Thr Lys Glu	
	515 520 525	
	aac ctc gtg ttc ctg gca cag aaa ctg ttc aac atc agc agc aac cac	1632
	Asn Leu Val Phe Leu Ala Gln Lys Leu Phe Asn Ile Ser Ser Asn His	
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	ctc gag gac tac aac agc atg tot gtg tcc tgg tcc cag ttc aac cgg	1680
	Leu Glu Asp Tyr Asn Ser Met Ser Val Ser Trp Ser Gln Phe Asn Arg	
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	gag aac ttg ccc ggc tgg aac tac acc ttc tgg cag tgg ttc gac ggg	1728
	Glu Asn Leu Pro Gly Trp Asn Tyr Thr Phe Trp Gln Trp Phe Asp Gly	
	565 570 575	
25	gtg atg gag gtg ctg aag aag cac cat aag ccc cat tgg aat gat ggg	1776
	Val Met Glu Val Leu Lys Lys His His Lys Pro His Trp Asn Asp Gly	

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	gct atc ctg ggt ttc gtg aac aag caa cag gcc cac gac ctg ctc atc			1824
	Ala Ile Leu Gly Phe Val Asn Lys Gln Gln Ala His Asp Leu Leu Ile			
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	aac aag ccg gac ggg acc ttc ctg ctg cgc ttc agt gac tcg gaa atc			1872
	Asn Lys Pro Asp Gly Thr Phe Leu Leu Arg Phe Ser Asp Ser Glu Ile			
	610	615	620	
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	ggg ggc atc acc att gct tgg aag ttt gac tct ccg gac cga aac ctc			1920
	Gly Gly Ile Thr Ile Ala Trp Lys Phe Asp Ser Pro Asp Arg Asn Leu			
	625	630	635	640
15	tgg aat ctg aag cca ttc acg acg cga gat ttc tcc att cgg tcc ctg			1968
	Trp Asn Leu Lys Pro Phe Thr Thr Arg Asp Phe Ser Ile Arg Ser Leu			
	645	650	655	
	gcc gac cgg ctg ggg gac ctg aac tac ctt atc tac gtg ttc cca gac			2016
20	Ala Asp Arg Leu Gly Asp Leu Asn Tyr Leu Ile Tyr Val Phe Pro Asp			
	660	665	670	
	cga ccc aag gac gag gtc ttt gcc aag tat tac act cct gta ctt gcg			2064
	Arg Pro Lys Asp Glu Val Phe Ala Lys Tyr Tyr Thr Pro Val Leu Ala			
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5	gag ttc gtc aat gca tcc aca gat gcc gga gcc agc gcc acc tac atg	2160
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	gac cag gct cct tcc cca gtc gtg tgc cct caa cct cac tac aac atg	2208
10	Asp Gln Ala Pro Ser Pro Val Val Cys Pro Gln Pro His Tyr Asn Met	
	725 730 735	
	tac cca ccc aac cct gac cct gtc ctt gac caa gat ggc gag ttt gac	2256
	Tyr Pro Pro Asn Pro Asp Pro Val Leu Asp Gln Asp Gly Glu Phe Asp	
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	ctg gat gag agc atg gat gtt gcc agg cac gtg gaa gaa ctt tta cgc	2304
	Leu Asp Glu Ser Met Asp Val Ala Arg His Val Glu Glu Leu Leu Arg	
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	Arg Pro Met Asp Ser Leu Asp Ala Arg Leu Ser Pro Pro Ala Gly Leu	
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Tyr Leu Ala Gln Trp Ile Glu Ser Gln Pro Trp Asp Ala Ile Asp Leu

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Asp Asn Pro Gln Asp Arg Gly Gln Ala Thr Gln Leu Leu Glu Gly Leu

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Val Gln Glu Leu Gln Lys Lys Ala Glu His Gln Val Gly Glu Asp Gly

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5 Phe Leu Leu Lys Ile Lys Leu Gly His Tyr Ala Thr Gln Leu Gln Asn

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Thr Tyr Asp Arg Cys Pro Met Glu Leu Val Arg Cys Ile Arg His Ile

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Leu Tyr Asn Glu Gln Arg Leu Val Arg Glu Ala Asn Asn Cys Ser Ser

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Pro Ala Gly Val Leu Val Asp Ala Met Ser Gln Lys His Leu Gln Ile

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Asn Gln Arg Phe Glu Glu Leu Arg Leu Ile Thr Gln Asp Thr Glu Asn

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25 Glu Leu Lys Lys Leu Gln Gln Thr Gln Glu Tyr Phe Ile Ile Gln Tyr

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Gln Glu Ser Leu Arg Ile Gln Ala Gln Phe Ala Gln Leu Gly Gln Leu

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Asn Pro Gln Glu Arg Met Ser Arg Glu Thr Ala Leu Gln Gln Lys Gln

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Val Ser Leu Glu Thr Trp Leu Gln Arg Glu Ala Gln Thr Leu Gln Gln

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15 Tyr Arg Val Glu Leu Ala Glu Lys His Gln Lys Thr Leu Gln Leu Leu

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230

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240

Arg Lys Gln Gln Thr Ile Ile Leu Asp Asp Glu Leu Ile Gln Trp Lys

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Arg Arg Gln Gln Leu Ala Gly Asn Gly Gly Pro Pro Glu Gly Ser Leu

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Asp Val Leu Gln Ser Trp Cys Glu Lys Leu Ala Glu Ile Ile Trp Gln

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10 Ile Pro Gly Pro Val Glu Glu Met Leu Ala Glu Val Asn Ala Thr Ile

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Thr Asp Ile Ile Ser Ala Leu Val Thr Ser Thr Phe Ile Ile Glu Lys

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Gln Pro Pro Gln Val Leu Lys Thr Gln Thr Lys Phe Ala Ala Thr Val

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Arg Leu Leu Val Gly Gly Lys Leu Asn Val His Met Asn Pro Pro Gln

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Val Lys Ala Thr Ile Ile Ser Glu Gln Gln Ala Lys Ser Leu Leu Lys

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Cys Val Met Glu Tyr His Gln Ala Thr Gly Thr Leu Ser Ala His Phe

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Arg Asn Met Ser Leu Lys Arg Ile Lys Arg Ala Asp Arg Arg Gly Ala

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Glu Ser Val Thr Glu Glu Lys Phe Thr Val Leu Phe Glu Ser Gln Phe

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Ser Val Gly Ser Asn Glu Leu Val Phe Gln Val Lys Thr Leu Ser Leu

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Pro Val Val Val Ile Val His Gly Ser Gln Asp His Asn Ala Thr Ala

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Thr Val Leu Trp Asp Asn Ala Phe Ala Glu Pro Gly Arg Val Pro Phe

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Ala Val Pro Asp Lys Val Leu Trp Pro Gln Leu Cys Glu Ala Leu Asn

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Asn Leu Val Phe Leu Ala Gln Lys Leu Phe Asn Ile Ser Ser Asn His

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Leu Glu Asp Tyr Asn Ser Met Ser Val Ser Trp Ser Gln Phe Asn Arg

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Glu Asn Leu Pro Gly Trp Asn Tyr Thr Phe Trp Gln Trp Phe Asp Gly

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570

575

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Val Met Glu Val Leu Lys Lys His His Lys Pro His Trp Asn Asp Gly

580

585

590

Ala Ile Leu Gly Phe Val Asn Lys Gln Gln Ala His Asp Leu Leu Ile

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595

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Asn Lys Pro Asp Gly Thr Phe Leu Leu Arg Phe Ser Asp Ser Glu Ile

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Gly Gly Ile Thr Ile Ala Trp Lys Phe Asp Ser Pro Asp Arg Asn Leu

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640

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Trp Asn Leu Lys Pro Phe Thr Thr Arg Asp Phe Ser Ile Arg Ser Leu

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660

665

670

Arg Pro Lys Asp Glu Val Phe Ala Lys Tyr Tyr Thr Pro Val Leu Ala

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675

680

685

Lys Ala Val Asp Gly Tyr Val Lys Pro Gln Ile Lys Gln Val Val Pro

690

695

700

5

Glu Phe Val Asn Ala Ser Thr Asp Ala Gly Ala Ser Ala Thr Tyr Met

705

710

715

720

10 Asp Gln Ala Pro Ser Pro Val Val Cys Pro Gln Pro His Tyr Asn Met

725

730

735

Tyr Pro Pro Asn Pro Asp Pro Val Leu Asp Gln Asp Gly Glu Phe Asp

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740

745

750

Leu Asp Glu Ser Met Asp Val Ala Arg His Val Glu Glu Leu Leu Arg

755

760

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Asp Asn Pro Gln Glu Asn Ile Lys Ala Thr Gln Leu Leu Glu Gly Leu
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Val Gln Glu Leu Gln Lys Lys Ala Glu His Gln Val Gly Glu Asp Gly
65 70 75 80

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10 Phe Leu Leu Lys Ile Lys Leu Gly His Tyr Ala Thr Gln Leu Gln Ser
85 90 95

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Thr Tyr Asp Arg Cys Pro Met Glu Leu Val Arg Cys Ile Arg His Ile
15 100 105 110

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Leu Tyr Asn Glu Gln Arg Leu Val Arg Glu Ala Asn Asn Gly Ser Ser
115 120 125

20 cca gct gga agt ctt gct gac gcc atg tcc cag aag cac ctt cag atc 432
Pro Ala Gly Ser Leu Ala Asp Ala Met Ser Gln Lys His Leu Gln Ile
130 135 140

25 aac caa acg ttt gag gag ctg cgc ctg atc aca cag gac acg gag aac 480
Asn Gln Thr Phe Glu Glu Leu Arg Leu Ile Thr Gln Asp Thr Glu Asn

	145	150	155	160	
	gag ctg aag aag ctg cag cag acc caa gag tac ttc atc atc cag tac				528
	Glu Leu Lys Lys Leu Gln Gln Thr Gln Glu Tyr Phe Ile Ile Gln Tyr				
5		165	170	175	
	cag gag agc ctg cgg atc caa gct cag ttt gcc cag ctg gga cag ctg				576
	Gln Glu Ser Leu Arg Ile Gln Ala Gln Phe Ala Gln Leu Gly Gln Leu				
	180	185	190		
10	aac ccc cag gag cgc atg agc agg gag acg gcc ctc cag cag aag caa				624
	Asn Pro Gln Glu Arg Met Ser Arg Glu Thr Ala Leu Gln Gln Lys Gln				
	195	200	205		
15	gtg tcc ctg gag acc tgg ctg cag cga gag gca cag aca ctg cag cag				672
	Val Ser Leu Glu Thr Trp Leu Gln Arg Glu Ala Gln Thr Leu Gln Gln				
	210	215	220		
	tac cga gtg gag ctg gct gag aag cac cag aag acc ctg cag ctg ctg				720
20	Tyr Arg Val Glu Leu Ala Glu Lys His Gln Lys Thr Leu Gln Leu Leu				
	225	230	235	240	
	ogg aag cag cag acc atc atc ctg gac gac gag ctg atc cag tgg aag				768
	Arg Lys Gln Gln Thr Ile Ile Leu Asp Asp Glu Leu Ile Gln Trp Lys				
25	245	250	255		

	cgg aga cag cag ctg gcc ggg aac ggg ggt ccc ccc gag ggc agc ctg	816
	Arg Arg Gln Gln Leu Ala Gly Asn Gly Gly Pro Pro Glu Gly Ser Leu	
	260 265 270	
5	gac gtg ctg cag tcc tgg tgt gag aag ctg gcc gag atc atc tgg cag	864
	Asp Val Leu Gln Ser Trp Cys Glu Lys Leu Ala Glu Ile Ile Trp Gln	
	275 280 285	
	aat cgg cag cag atc cgc agg gct gag cac ctg tgc cag cag ctg ccc	912
10	Asn Arg Gln Gln Ile Arg Arg Ala Glu His Leu Cys Gln Gln Leu Pro	
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	atc cca ggc ccc gtg gag gag atg ctg gct gag gtc aac gcc acc atc	960
	Ile Pro Gly Pro Val Glu Glu Met Leu Ala Glu Val Asn Ala Thr Ile	
15	305 310 315 320	
	acg gac atc atc tca gcc ctg gtc acc agc acg ttc atc atc gag aag	1008
	Thr Asp Ile Ile Ser Ala Leu Val Thr Ser Thr Phe Ile Ile Glu Lys	
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	Gln Pro Pro Gln Val Leu Lys Thr Gln Thr Lys Phe Ala Ala Thr Val	
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	Arg Leu Leu Val Gly Gly Lys Leu Asn Val His Met Asn Pro Pro Gln	

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	Val Lys Ala Thr Ile Ile Ser Glu Gln Gln Ala Lys Ser Leu Leu Lys			
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	Asn Glu Asn Thr Arg Asn Asp Tyr Ser Gly Glu Ile Leu Asn Asn Cys			
	385	390	395	400
10	tgc gtc atg gag tac cac cag gcc act ggc acg ctc agc gcc cac ttc			1248
	Cys Val Met Glu Tyr His Gln Ala Thr Gly Thr Leu Ser Ala His Phe			
	405	410	415	
15	aga aac atg tcc ctg aaa cga atc aag aga tct gac cgc cgt ggt gca			1296
	Arg Asn Met Ser Leu Lys Arg Ile Lys Arg Ser Asp Arg Arg Gly Ala			
	420	425	430	
	gag tca gta acg gaa gag aag ttc acg atc ctg ttt gac tca cag ttc			1344
20	Glu Ser Val Thr Glu Glu Lys Phe Thr Ile Leu Phe Asp Ser Gln Phe			
	435	440	445	
	agc gtc ggt gga aac gag ctg gtc ttt caa gtc aag acc ttg tcg ctc			1392
	Ser Val Gly Gly Asn Glu Leu Val Phe Gln Val Lys Thr Leu Ser Leu			
25	450	455	460	

	ccg gtg gtg gtg att gtt cac ggc agc cag gac aac aat gcc aca gcc	1440
	Pro Val Val Val Ile Val His Gly Ser Gln Asp Asn Asn Ala Thr Ala	
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5	act gtc ctc tgg gac aac gcc ttt gca gag cct ggc agg gtg cca ttt	1488
	Thr Val Leu Trp Asp Asn Ala Phe Ala Glu Pro Gly Arg Val Pro Phe	
	485 490 495	
	gcc gtg cct gac aag gtg ctg tgg ccg cag ctg tgt gaa gcg ctc aac	1536
10	Ala Val Pro Asp Lys Val Leu Trp Pro Gln Leu Cys Glu Ala Leu Asn	
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	Met Lys Phe Lys Ala Glu Val Gln Ser Asn Arg Gly Leu Thr Lys Glu	
15	515 520 525	
	aac ctc gtg ttc ctg gca cag aaa ctg ttc aac atc agc agc aac cac	1632
	Asn Leu Val Phe Leu Ala Gln Lys Leu Phe Asn Ile Ser Ser Asn His	
	530 535 540	
20	ctc gag gac tac aac agc atg tcc gtg tcc tgg tcc cag ttc aac cgg	1680
	Leu Glu Asp Tyr Asn Ser Met Ser Val Ser Trp Ser Gln Phe Asn Arg	
	545 550 555 560	
25	gag aat ttg cca gga cgg aat tac act ttc tgg cag tgg ttt gat ggc	1728
	Glu Asn Leu Pro Gly Arg Asn Tyr Thr Phe Trp Gln Trp Phe Asp Gly	

	565	570	575	
	gtg atg gaa gta ttg aaa aaa cat ctc aag cct cac tgg aat gat ggg			1776
	Val Met Glu Val Leu Lys Lys His Leu Lys Pro His Trp Asn Asp Gly			
5	580	585	590	
	gct atc ctg ggt ttc gtg aac aag caa cag gcc cac gac ctg ctc atc			1824
	Ala Ile Leu Gly Phe Val Asn Lys Gln Gln Ala His Asp Leu Leu Ile			
	595	600	605	
10	aac aag ccg gac ggg acc ttc ctg ctg cgc ttc agc gac tcg gaa atc			1872
	Asn Lys Pro Asp Gly Thr Phe Leu Leu Arg Phe Ser Asp Ser Glu Ile			
	610	615	620	
15	ggg ggc atc acc att gct tgg aag ttt gac tct cag gag aga atg ttt			1920
	Gly Gly Ile Thr Ile Ala Trp Lys Phe Asp Ser Gln Glu Arg Met Phe			
	625	630	635	640
	tgg aat ctg atg cct ttt acc act aga gac ttc tct atc cgg tcc ctc			1968
20	Trp Asn Leu Met Pro Phe Thr Thr Arg Asp Phe Ser Ile Arg Ser Leu			
	645	650	655	
	gct gac cgc ctg ggg gac ctg aat tac ctc ata tat gtg ttt cct gat			2016
	Ala Asp Arg Leu Gly Asp Leu Asn Tyr Leu Ile Tyr Val Phe Pro Asp			
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	cgg cca aag gat gaa gta tat tct aag tac tac aca ccg gtc ccc tgt	2064
	Arg Pro Lys Asp Glu Val Tyr Ser Lys Tyr Tyr Thr Pro Val Pro Cys	
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5	gag ccc gca act gcg aaa gca gct gac gga tac gtg aag cca cag atc	2112
	Glu Pro Ala Thr Ala Lys Ala Ala Asp Gly Tyr Val Lys Pro Gln Ile	
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10	Lys Gln Val Val Pro Glu Phe Ala Asn Ala Ser Thr Asp Ala Gly Ser	
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	ggc gcc acc tac atg gat cag gct cct tcc cca gtc gtg tgc cct cag	2208
	Gly Ala Thr Tyr Met Asp Gln Ala Pro Ser Pro Val Val Cys Pro Gln	
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	Ala His Tyr Asn Met Tyr Pro Pro Asn Pro Asp Ser Val Leu Asp Thr	
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25	gaa gag ctc tta ggc cgg ccc atg gac agt cag tgg atc cct cac gca	2352
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Gln Ser

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Asp Asn Pro Gln Glu Asn Ile Lys Ala Thr Gln Leu Leu Glu Gly Leu

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60

5 Val Gln Glu Leu Gln Lys Lys Ala Glu His Gln Val Gly Glu Asp Gly

65

70

75

80

Phe Leu Leu Lys Ile Lys Leu Gly His Tyr Ala Thr Gln Leu Gln Ser

10

85

90

95

Thr Tyr Asp Arg Cys Pro Met Glu Leu Val Arg Cys Ile Arg His Ile

100

105

110

15

Leu Tyr Asn Glu Gln Arg Leu Val Arg Glu Ala Asn Asn Gly Ser Ser

115

120

125

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Pro Ala Gly Ser Leu Ala Asp Ala Met Ser Gln Lys His Leu Gln Ile

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25 Asn Gln Thr Phe Glu Glu Leu Arg Leu Ile Thr Gln Asp Thr Glu Asn

145

150

155

160

Glu Leu Lys Lys Leu Gln Gln Thr Gln Glu Tyr Phe Ile Ile Gln Tyr

165

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175

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Gln Glu Ser Leu Arg Ile Gln Ala Gln Phe Ala Gln Leu Gly Gln Leu

180

185

190

10

Asn Pro Gln Glu Arg Met Ser Arg Glu Thr Ala Leu Gln Gln Lys Gln

195

200

205

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210

215

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Tyr Arg Val Glu Leu Ala Glu Lys His Gln Lys Thr Leu Gln Leu Leu

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230

235

240

Arg Lys Gln Gln Thr Ile Ile Leu Asp Asp Glu Leu Ile Gln Trp Lys

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270

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280

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10

290

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300

Ile Pro Gly Pro Val Glu Glu Met Leu Ala Glu Val Asn Ala Thr Ile

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315

320

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Thr Asp Ile Ile Ser Ala Leu Val Thr Ser Thr Phe Ile Ile Glu Lys

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25 Arg Leu Leu Val Gly Gly Lys Leu Asn Val His Met Asn Pro Pro Gln

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Val Lys Ala Thr Ile Ile Ser Glu Gln Gln Ala Lys Ser Leu Leu Lys

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Asn Glu Asn Thr Arg Asn Asp Tyr Ser Gly Glu Ile Leu Asn Asn Cys

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395

400

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Cys Val Met Glu Tyr His Gln Ala Thr Gly Thr Leu Ser Ala His Phe

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410

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15 Arg Asn Met Ser Leu Lys Arg Ile Lys Arg Ser Asp Arg Arg Gly Ala

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Glu Ser Val Thr Glu Glu Lys Phe Thr Ile Leu Phe Asp Ser Gln Phe

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Ser Val Gly Gly Asn Glu Leu Val Phe Gln Val Lys Thr Leu Ser Leu

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515 520 525

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530 535 540

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545 550 555 560

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565 570 575

Val Met Glu Val Leu Lys Lys His Leu Lys Pro His Trp Asn Asp Gly

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Ala Ile Leu Gly Phe Val Asn Lys Gln Gln Ala His Asp Leu Leu Ile

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615

620

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Ala Asp Arg Leu Gly Asp Leu Asn Tyr Leu Ile Tyr Val Phe Pro Asp

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Arg Pro Lys Asp Glu Val Tyr Ser Lys Tyr Tyr Thr Pro Val Pro Cys

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680

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690

695

700

Lys Gln Val Val Pro Glu Phe Ala Asn Ala Ser Thr Asp Ala Gly Ser

10 705

710

715

720

Gly Ala Thr Tyr Met Asp Gln Ala Pro Ser Pro Val Val Cys Pro Gln

725

730

735

15

Ala His Tyr Asn Met Tyr Pro Pro Asn Pro Asp Ser Val Leu Asp Thr

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	tac ctg gcc cag tgg atc gag agc cag ccg tgg gat gct att gac ttg			144
	Tyr Leu Ala Gln Trp Ile Glu Ser Gln Pro Trp Asp Ala Ile Asp Leu			
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	gat aat ccc cag gac cga ggt cag gcc acc caa ctc ctg gag ggc ctg			192
	Asp Asn Pro Gln Asp Arg Gly Gln Ala Thr Gln Leu Leu Glu Gly Leu			
	50	55	60	
10	gtg cag gag ctg cag aag aag gcg gag cac cag gtg ggg gaa gat ggg			240
	Val Gln Glu Leu Gln Lys Lys Ala Glu His Gln Val Gly Glu Asp Gly			
	65	70	75	80
	ttt ttg ctg aag atc aag ctg ggg cac tat gcc aca cag ctc cag aac			288
15	Phe Leu Leu Lys Ile Lys Leu Gly His Tyr Ala Thr Gln Leu Gln Asn			
	85	90	95	
	acg tat gac cgc tgt ccc atg gag ctg gtt cgc tgt atc cgt cac att			336
20	Thr Tyr Asp Arg Cys Pro Met Glu Leu Val Arg Cys Ile Arg His Ile			
	100	105	110	
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	Leu Tyr Asn Glu Gln Arg Leu Val Arg Glu Ala Asn Asn Cys Ser Ser			
25	115	120	125	

	cct gct ggt gtc ctg gtt gac gcc atg tcc cag aag cac ctt cag atc	432
	Pro Ala Gly Val Leu Val Asp Ala Met Ser Gln Lys His Leu Gln Ile	
	130 135 140	
5	aac caa agg ttt gag gag ctg cgc ctg atc aca cag gac acg gag aac	480
	Asn Gln Arg Phe Glu Glu Leu Arg Leu Ile Thr Gln Asp Thr Glu Asn	
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	Val Ser Leu Glu Thr Trp Leu Gln Arg Glu Ala Gln Thr Leu Gln Gln	
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	Tyr Arg Val Glu Leu Ala Glu Lys His Gln Lys Thr Leu Gln Leu Leu	

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	Asp Val Leu Gln Ser Trp Cys Glu Lys Leu Ala Glu Ile Ile Trp Gln				
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	aac cgg cag cag atc cgc agg gct gag cgc ctg tgc cag cag ctg ccc				912
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	305	310	315	320	
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	Thr Asp Ile Ile Ser Ala Leu Val Thr Ser Thr Phe Ile Ile Glu Lys				
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	Cys Val Met Glu Tyr His Gln Ala Thr Gly Thr Leu Ser Ala His Phe	
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	Pro Val Val Val Ile Val His Gly Ser Gln Asp His Asn Ala Thr Ala			
	465	470	475	480
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	Thr Val Leu Trp Asp Asn Ala Phe Ala Glu Pro Gly Arg Val Pro Phe			
	485	490	495	
15	gct gtg cct gac aag gtg ctg tgg ccg cag ctg tgt gaa gcg ctc aac			1536
	Ala Val Pro Asp Lys Val Leu Trp Pro Gln Leu Cys Glu Ala Leu Asn			
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20	Met Lys Phe Lys Ala Glu Val Gln Ser Asn Arg Gly Leu Thr Lys Glu			
	515	520	525	
	aac ctc gtg ttc ctg gca cag aaa ctg ttc aac atc agc agc aac cac			1632
	Asn Leu Val Phe Leu Ala Gln Lys Leu Phe Asn Ile Ser Ser Asn His			
25	530	535	540	

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	Ala Ile Leu Gly Phe Val Asn Lys Gln Gln Ala His Asp Leu Leu Ile	
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25	tgg aat ctg aag cca ttc acg acg cga gat ttc tcc att cgg tcc ctg	1968
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	cga ccc aag gac gag gtc ttt gcc aag tat tac act cct gta ctt gcg			2064
	Arg Pro Lys Asp Glu Val Phe Ala Lys Tyr Tyr Thr Pro Val Leu Ala			
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	Lys Ala Val Asp Gly Tyr Val Lys Pro Gln Ile Lys Gln Val Val Pro			
	690	695	700	
15	gag ttc gtc aat gca ttc aca gat gcc gga gcc agc gcc acc tac atg			2160
	Glu Phe Val Asn Ala Phe Thr Asp Ala Gly Ala Ser Ala Thr Tyr Met			
	705	710	715	720
	gac cag gct cct tcc cca gtc gtg tgc cct caa cct cac tac aac atg			2208
20	Asp Gln Ala Pro Ser Pro Val Val Cys Pro Gln Pro His Tyr Asn Met			
	725	730	735	
	tac cca ccc aac cct gac cct gtc ctt gac caa gat ggc gag ttt gac			2256
	Tyr Pro Pro Asn Pro Asp Pro Val Leu Asp Gln Asp Gly Glu Phe Asp			
25	740	745	750	

ctg gat gag agc atg gat gtt gcc agg cac gtg gaa gaa ctt tta cgc 2304

Leu Asp Glu Ser Met Asp Val Ala Arg His Val Glu Glu Leu Leu Arg

755

760

765

5 cgg ccc atg gac agt ctc gac gcc cgc ctc tcc cca cct gct ggt ctc 2352

Arg Pro Met Asp Ser Leu Asp Ala Arg Leu Ser Pro Pro Ala Gly Leu

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ttc acc tcc gct aga agc tcc ctg tcc tga 2382

10 Phe Thr Ser Ala Arg Ser Ser Leu Ser

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Gln Met Gln Val Leu Tyr Gly Gln His Phe Pro Ile Glu Val Arg His

20

25

30

5

Tyr Leu Ala Gln Trp Ile Glu Ser Gln Pro Trp Asp Ala Ile Asp Leu

35

40

45

10 Asp Asn Pro Gln Asp Arg Gly Gln Ala Thr Gln Leu Leu Glu Gly Leu

50

55

60

Val Gln Glu Leu Gln Lys Lys Ala Glu His Gln Val Gly Glu Asp Gly

15

65

70

75

80

Phe Leu Leu Lys Ile Lys Leu Gly His Tyr Ala Thr Gln Leu Gln Asn

20

85

90

95

Thr Tyr Asp Arg Cys Pro Met Glu Leu Val Arg Cys Ile Arg His Ile

100

105

110

25

Leu Tyr Asn Glu Gln Arg Leu Val Arg Glu Ala Asn Asn Cys Ser Ser

115

120

125

5 Pro Ala Gly Val Leu Val Asp Ala Met Ser Gln Lys His Leu Gln Ile

130

135

140

Asn Gln Arg Phe Glu Glu Leu Arg Leu Ile Thr Gln Asp Thr Glu Asn

10

145

150

155

160

Glu Leu Lys Lys Leu Gln Gln Thr Gln Glu Tyr Phe Ile Ile Gln Tyr

165

170

175

15

Gln Glu Ser Leu Arg Ile Gln Ala Gln Phe Ala Gln Leu Gly Gln Leu

180

185

190

20

Asn Pro Gln Glu Arg Met Ser Arg Glu Thr Ala Leu Gln Gln Lys Gln

195

200

205

25 Val Ser Leu Glu Thr Trp Leu Gln Arg Glu Ala Gln Thr Leu Gln Gln

210

215

220

Tyr Arg Val Glu Leu Ala Glu Lys His Gln Lys Thr Leu Gln Leu Leu

225

230

235

240

5

Arg Lys Gln Gln Thr Ile Ile Leu Asp Asp Glu Leu Ile Gln Trp Lys

245

250

255

10

Arg Arg Gln Gln Leu Ala Gly Asn Gly Gly Pro Pro Glu Gly Ser Leu

260

265

270

15

Asp Val Leu Gln Ser Trp Cys Glu Lys Leu Ala Glu Ile Ile Trp Gln

275

280

285

Asn Arg Gln Gln Ile Arg Arg Ala Glu Arg Leu Cys Gln Gln Leu Pro

20

290

295

300

Ile Pro Gly Pro Val Glu Glu Met Leu Ala Glu Val Asn Ala Thr Ile

305

310

315

320

25

Thr Asp Ile Ile Ser Ala Leu Val Thr Ser Thr Phe Ile Ile Glu Lys

325

330

335

5 Gln Pro Pro Gln Val Leu Lys Thr Gln Thr Lys Phe Ala Ala Thr Val

340

345

350

Arg Leu Leu Val Gly Gly Lys Leu Asn Val His Met Asn Pro Pro Gln

10

355

360

365

Val Lys Ala Thr Ile Ile Ser Glu Gln Gln Ala Lys Ser Leu Leu Lys

370

375

380

15

Asn Glu Asn Thr Arg Asn Glu Cys Ser Gly Glu Ile Leu Asn Asn Cys

385

390

395

400

20

Cys Val Met Glu Tyr His Gln Ala Thr Gly Thr Leu Ser Ala His Phe

405

410

415

25 Arg Asn Met Ser Leu Lys Arg Ile Lys Arg Ala Asp Arg Arg Gly Ala

420

425

430

Glu Ser Val Thr Glu Glu Lys Phe Thr Val Leu Phe Glu Ser Gln Phe

435

440

445

5

Ser Val Gly Ser Asn Glu Leu Val Phe Gln Val Lys Thr Leu Ser Leu

450

455

460

10

Pro Val Val Val Ile Val His Gly Ser Gln Asp His Asn Ala Thr Ala

465

470

475

480

15 Thr Val Leu Trp Asp Asn Ala Phe Ala Glu Pro Gly Arg Val Pro Phe

485

490

495

Ala Val Pro Asp Lys Val Leu Trp Pro Gln Leu Cys Glu Ala Leu Asn

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500

505

510

Met Lys Phe Lys Ala Glu Val Gln Ser Asn Arg Gly Leu Thr Lys Glu

515

520

525

25

Asn Leu Val Phe Leu Ala Gln Lys Leu Phe Asn Ile Ser Ser Asn His

530

535

540

5 Leu Glu Asp Tyr Asn Ser Met Ser Val Ser Trp Ser Gln Phe Asn Arg

545

550

555

560

Glu Asn Leu Pro Gly Trp Asn Tyr Thr Phe Trp Gln Trp Phe Asp Gly

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565

570

575

Val Met Glu Val Leu Lys Lys His His Lys Pro His Trp Asn Asp Gly

15

580

585

590

Ala Ile Leu Gly Phe Val Asn Lys Gln Gln Ala His Asp Leu Leu Ile

595

600

605

20

Asn Lys Pro Asp Gly Thr Phe Leu Leu Arg Phe Ser Asp Ser Glu Ile

610

615

620

25

Gly Gly Ile Thr Ile Ala Trp Lys Phe Asp Ser Pro Asp Arg Asn Leu

625 630 635 640

Trp Asn Leu Lys Pro Phe Thr Thr Arg Asp Phe Ser Ile Arg Ser Leu

5 645 650 655

Ala Asp Arg Leu Gly Asp Leu Asn Tyr Leu Ile Tyr Val Phe Pro Asp

660 665 670

10

Arg Pro Lys Asp Glu Val Phe Ala Lys Tyr Tyr Thr Pro Val Leu Ala

675 680 685

15

Lys Ala Val Asp Gly Tyr Val Lys Pro Gln Ile Lys Gln Val Val Pro

690 695 700

20 Glu Phe Val Asn Ala Phe Thr Asp Ala Gly Ala Ser Ala Thr Tyr Met

705 710 715 720

Asp Gln Ala Pro Ser Pro Val Val Cys Pro Gln Pro His Tyr Asn Met

25 725 730 735

Tyr Pro Pro Asn Pro Asp Pro Val Leu Asp Gln Asp Gly Glu Phe Asp

740

745

750

5

Leu Asp Glu Ser Met Asp Val Ala Arg His Val Glu Glu Leu Leu Arg

755

760

765

10 Arg Pro Met Asp Ser Leu Asp Ala Arg Leu Ser Pro Pro Ala Gly Leu

770

775

780

Phe Thr Ser Ala Arg Ser Ser Leu Ser

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Met Ala Gly Trp Ile Gln Ala Gln Gln Leu Gln Gly Asp Ala Leu Arg

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5

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15

cag atg caa gtg ttg tat ggg cag cat ttc ccc atc gag gtc cgg cac 96

20 Gln Met Gln Val Leu Tyr Gly Gln His Phe Pro Ile Glu Val Arg His

20

25

30

tac ctg gcc cag tgg atc gag agc cag ccg tgg gat gct att gac ttg 144

Tyr Leu Ala Gln Trp Ile Glu Ser Gln Pro Trp Asp Ala Ile Asp Leu

25

35

40

45

	gat aat ccc cag gac cga ggt cag gcc acc caa ctc ctg gag ggc ctg	192
	Asp Asn Pro Gln Asp Arg Gly Gln Ala Thr Gln Leu Leu Glu Gly Leu	
	50 55 60	
5	gtg cag gag ctg cag aag aag gcg gag cac cag gtg ggg gaa gat ggg	240
	Val Gln Glu Leu Gln Lys Lys Ala Glu His Gln Val Gly Glu Asp Gly	
	65 70 75 80	
	ttt ttg ctg aag atc aag ctg ggg cac tat gcc aca cag ctc cag aac	288
10	Phe Leu Leu Lys Ile Lys Leu Gly His Tyr Ala Thr Gln Leu Gln Asn	
	85 90 95	
	acg tat gac cgc tgt ccc atg gag ctg gtt cgc tgt atc cgt cac att	336
	Thr Tyr Asp Arg Cys Pro Met Glu Leu Val Arg Cys Ile Arg His Ile	
15	100 105 110	
	ctg tac aac gaa cag agg ctg gtt cgc gaa gcc aac aat tgc agc tcc	384
	Leu Tyr Asn Glu Gln Arg Leu Val Arg Glu Ala Asn Asn Cys Ser Ser	
	115 120 125	
20	cct gct ggt gtc ctg gtt gac gcc atg tcc cag aag cac ctt cag atc	432
	Pro Ala Gly Val Leu Val Asp Ala Met Ser Gln Lys His Leu Gln Ile	
	130 135 140	
25	aac caa agg ttt gag ggg ctg cgc ctg atc aca cag gac acg gag aac	480
	Asn Gln Arg Phe Glu Gly Leu Arg Leu Ile Thr Gln Asp Thr Glu Asn	

	145	150	155	160	
	gag ctg aag aag ctg cag cag acc caa gag tac ttc atc atc cag tac				528
	Glu Leu Lys Lys Leu Gln Gln Thr Gln Glu Tyr Phe Ile Ile Gln Tyr				
5		165	170	175	
	cag gag agc ctg cgg atc caa gct cag ttt gcc cag ctg ggc cag ctg				576
	Gln Glu Ser Leu Arg Ile Gln Ala Gln Phe Ala Gln Leu Gly Gln Leu				
		180	185	190	
10	aac ccc cag gag cgc atg agc agg gag acg gcc ctc cag cag aag caa				624
	Asn Pro Gln Glu Arg Met Ser Arg Glu Thr Ala Leu Gln Gln Lys Gln				
		195	200	205	
15	gtg tcc ctg gag acc tgg ctg cag cga gag gca cag aca ctg cag cag				672
	Val Ser Leu Glu Thr Trp Leu Gln Arg Glu Ala Gln Thr Leu Gln Gln				
		210	215	220	
	tac cga gtg gag ctg gct gag aag cac cag aag acc ctg cag ctg ctg				720
20	Tyr Arg Val Glu Leu Ala Glu Lys His Gln Lys Thr Leu Gln Leu Leu				
		225	230	235	240
	cgg aag cag cag acc atc atc ctg gac gac gag ctg atc cag tgg aag				768
	Arg Lys Gln Gln Thr Ile Ile Leu Asp Asp Glu Leu Ile Gln Trp Lys				
25		245	250	255	

	cgg aga cag cag ctg gcc ggg aac ggg ggt ccc ccc gag ggc agc ctg	816
	Arg Arg Gln Gln Leu Ala Gly Asn Gly Gly Pro Pro Glu Gly Ser Leu	
	260 265 270	
5	gac gtg ctg cag tcc tgg tgt gag aag ctg gcc gag atc atc tgg cag	864
	Asp Val Leu Gln Ser Trp Cys Glu Lys Leu Ala Glu Ile Ile Trp Gln	
	275 280 285	
	aac cgg cag cag atc cgc agg gct gag cac ctg tgc cag cag ctg ccc	912
10	Asn Arg Gln Gln Ile Arg Arg Ala Glu His Leu Cys Gln Gln Leu Pro	
	290 295 300	
	atc cca ggc ccc gtg gag gag atg ctg gct gag gtc aac gcc acc atc	960
	Ile Pro Gly Pro Val Glu Glu Met Leu Ala Glu Val Asn Ala Thr Ile	
15	305 310 315 320	
	acg gac atc atc tca gct ctg gtc acc agc acg ttc atc atc gag aag	1008
	Thr Asp Ile Ile Ser Ala Leu Val Thr Ser Thr Phe Ile Ile Glu Lys	
	325 330 335	
20	cag cct cct cag gtc ctg aag acc cag acc aag ttt gcg gcc acc gtg	1056
	Gln Pro Pro Gln Val Leu Lys Thr Gln Thr Lys Phe Ala Ala Thr Val	
	340 345 350	
25	cgc ctg ctg gtg ggg gga aag ctg aat gtg cac atg aac ccc ccg cag	1104
	Arg Leu Leu Val Gly Gly Lys Leu Asn Val His Met Asn Pro Pro Gln	

	355	360	365	
	gtg aag gcg acc atc atc agc gag cag cag gcc aag tcc ctg ctc aag			1152
	Val Lys Ala Thr Ile Ile Ser Glu Gln Gln Ala Lys Ser Leu Leu Lys			
5	370	375	380	
	aat gag aac acc cgc aat gag tgc agc ggc gag atc ctg aac aac tgt			1200
	Asn Glu Asn Thr Arg Asn Glu Cys Ser Gly Glu Ile Leu Asn Asn Cys			
	385	390	395	400
10				
	tgc gtc atg gag tac cac cag gcc act ggc acg ctc agc gcc cac ttc			1248
	Cys Val Met Glu Tyr His Gln Ala Thr Gly Thr Leu Ser Ala His Phe			
	405	410	415	
15	aga aac atg tca ctg aaa aga atc aag cgc gcc gac agg cgt ggt gca			1296
	Arg Asn Met Ser Leu Lys Arg Ile Lys Arg Ala Asp Arg Arg Gly Ala			
	420	425	430	
	gag tcg gtg acg gag gag aag ttc aca gtc ctg ttt gag tct cag ttc			1344
20	Glu Ser Val Thr Glu Glu Lys Phe Thr Val Leu Phe Glu Ser Gln Phe			
	435	440	445	
	agc gtt ggc agc aac gag ctg gtg ttc cag gtg aag acc ctg tcc ctc			1392
	Ser Val Gly Ser Asn Glu Leu Val Phe Gln Val Lys Thr Leu Ser Leu			
25	450	455	460	

	cct gtg gtc gtt atc gtc cat ggc agc cag gac cac aat gct act gcc	1440
	Pro Val Val Val Ile Val His Gly Ser Gln Asp His Asn Ala Thr Ala	
	465 470 475 480	
5	acc gtg ctg tgg gac aat gcc ttt gct gag ccg ggc agg gtg cca ttt	1488
	Thr Val Leu Trp Asp Asn Ala Phe Ala Glu Pro Gly Arg Val Pro Phe	
	485 490 495	
	gct gtg cct gac aag gtg ctg tgg ccg cag ctg tgt gaa gcg ctc aac	1536
10	Ala Val Pro Asp Lys Val Leu Trp Pro Gln Leu Cys Glu Ala Leu Asn	
	500 505 510	
	atg aaa ttc aag gct gaa gta cag agc aac ccg ggc ttg acc aaa gag	1584
	Met Lys Phe Lys Ala Glu Val Gln Ser Asn Arg Gly Leu Thr Lys Glu	
15	515 520 525	
	aac ctc gtg ttc ctg gca cag aaa ctg ttc aac atc agc agc aac cac	1632
	Asn Leu Val Phe Leu Ala Gln Lys Leu Phe Asn Ile Ser Ser Asn His	
	530 535 540	
20	ctc gag gac tac aac agc atg tct gtg tcc tgg tcc cag ttc aac ccg	1680
	Leu Glu Asp Tyr Asn Ser Met Ser Val Ser Trp Ser Gln Phe Asn Arg	
	545 550 555 560	
25	gag aac ttg ccc ggc tgg aac tac acc ttc tgg cag tgg ttc gac ggg	1728
	Glu Asn Leu Pro Gly Trp Asn Tyr Thr Phe Trp Gln Trp Phe Asp Gly	

	565	570	575	
	gtg atg gag gtg ctg aag aag cac cat aag ccc cat tgg aat gat ggg			1776
	Val Met Glu Val Leu Lys Lys His His Lys Pro His Trp Asn Asp Gly			
5	580	585	590	
	gct atc ctg ggt ttc gtg aac aag caa cag gcc cac gac ctg ctc atc			1824
	Ala Ile Leu Gly Phe Val Asn Lys Gln Gln Ala His Asp Leu Leu Ile			
	595	600	605	
10	aac aag ccg gac ggg acc ttc ctg ctg cgc ttc agt gac tcg gaa atc			1872
	Asn Lys Pro Asp Gly Thr Phe Leu Leu Arg Phe Ser Asp Ser Glu Ile			
	610	615	620	
15	ggg ggc atc acc att gct tgg aag ttt gac tct ccg gac cga aac ctc			1920
	Gly Gly Ile Thr Ile Ala Trp Lys Phe Asp Ser Pro Asp Arg Asn Leu			
	625	630	635	640
	tgg aat ctg aag cca ttc acg acg cga gat ttc tcc att cgg tcc ctg			1968
20	Trp Asn Leu Lys Pro Phe Thr Thr Arg Asp Phe Ser Ile Arg Ser Leu			
	645	650	655	
	gcc gac cgg ctg ggg gac ctg aac tac ctt atc tac gtg ttc cca gac			2016
	Ala Asp Arg Leu Gly Asp Leu Asn Tyr Leu Ile Tyr Val Phe Pro Asp			
25	660	665	670	

	cga ccc aag gac gag gtc ttt gcc aag tat tac act cct gta ctt gcg	2064
	Arg Pro Lys Asp Glu Val Phe Ala Lys Tyr Tyr Thr Pro Val Leu Ala	
	675 680 685	
5	aaa gca gtt gac gga tac gtg aag cca cag atc aag caa gtg gtc cct	2112
	Lys Ala Val Asp Gly Tyr Val Lys Pro Gln Ile Lys Gln Val Val Pro	
	690 695 700	
	gag ttc gtc aat gca ttc aca gat gcc gga gcc agc gcc acc tac atg	2160
10	Glu Phe Val Asn Ala Phe Thr Asp Ala Gly Ala Ser Ala Thr Tyr Met	
	705 710 715 720	
	gac cag gct cct tcc cca gtc gtg tgc cct caa cct cac tac aac atg	2208
	Asp Gln Ala Pro Ser Pro Val Val Cys Pro Gln Pro His Tyr Asn Met	
15	725 730 735	
	tac cca ccc aac cct gac cct gtc ctt gac caa gat ggc gag ttt gac	2256
	Tyr Pro Pro Asn Pro Asp Pro Val Leu Asp Gln Asp Gly Glu Phe Asp	
	740 745 750	
20	ctg gat gag agc atg gat gtt gcc agg cac gtg gaa gaa ctt tta cgc	2304
	Leu Asp Glu Ser Met Asp Val Ala Arg His Val Glu Glu Leu Leu Arg	
	755 760 765	
25	cgg ccc atg gac agt ctc gac gcc cgc ctc tcc cca cct gct ggt ctc	2352
	Arg Pro Met Asp Ser Leu Asp Ala Arg Leu Ser Pro Pro Ala Gly Leu	

770

775

780

ttc acc tcc gct aga agc tcc ctg tcc tga

2382

Phe Thr Ser Ala Arg Ser Ser Leu Ser

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Gln Met Gln Val Leu Tyr Gly Gln His Phe Pro Ile Glu Val Arg His

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20

25

30

Tyr Leu Ala Gln Trp Ile Glu Ser Gln Pro Trp Asp Ala Ile Asp Leu

35

40

45

25

Asp Asn Pro Gln Asp Arg Gly Gln Ala Thr Gln Leu Leu Glu Gly Leu

50

55

60

5 Val Gln Glu Leu Gln Lys Lys Ala Glu His Gln Val Gly Glu Asp Gly

65

70

75

80

Phe Leu Leu Lys Ile Lys Leu Gly His Tyr Ala Thr Gln Leu Gln Asn

10

85

90

95

Thr Tyr Asp Arg Cys Pro Met Glu Leu Val Arg Cys Ile Arg His Ile

100

105

110

15

Leu Tyr Asn Glu Gln Arg Leu Val Arg Glu Ala Asn Asn Cys Ser Ser

115

120

125

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Pro Ala Gly Val Leu Val Asp Ala Met Ser Gln Lys His Leu Gln Ile

130

135

140

25 Asn Gln Arg Phe Glu Gly Leu Arg Leu Ile Thr Gln Asp Thr Glu Asn

145

150

155

160

Glu Leu Lys Lys Leu Gln Gln Thr Gln Glu Tyr Phe Ile Ile Gln Tyr

165

170

175

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Gln Glu Ser Leu Arg Ile Gln Ala Gln Phe Ala Gln Leu Gly Gln Leu

180

185

190

10

Asn Pro Gln Glu Arg Met Ser Arg Glu Thr Ala Leu Gln Gln Lys Gln

195

200

205

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Val Ser Leu Glu Thr Trp Leu Gln Arg Glu Ala Gln Thr Leu Gln Gln

210

215

220

Tyr Arg Val Glu Leu Ala Glu Lys His Gln Lys Thr Leu Gln Leu Leu

20

225

230

235

240

Arg Lys Gln Gln Thr Ile Ile Leu Asp Asp Glu Leu Ile Gln Trp Lys

245

250

255

25

Arg Arg Gln Gln Leu Ala Gly Asn Gly Gly Pro Pro Glu Gly Ser Leu

260

265

270

5 Asp Val Leu Gln Ser Trp Cys Glu Lys Leu Ala Glu Ile Ile Trp Gln

275

280

285

Asn Arg Gln Gln Ile Arg Arg Ala Glu His Leu Cys Gln Gln Leu Pro

10

290

295

300

Ile Pro Gly Pro Val Glu Glu Met Leu Ala Glu Val Asn Ala Thr Ile

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Thr Asp Ile Ile Ser Ala Leu Val Thr Ser Thr Phe Ile Ile Glu Lys

325

330

335

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Gln Pro Pro Gln Val Leu Lys Thr Gln Thr Lys Phe Ala Ala Thr Val

340

345

350

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Arg Leu Leu Val Gly Gly Lys Leu Asn Val His Met Asn Pro Pro Gln

355

360

365

Val Lys Ala Thr Ile Ile Ser Glu Gln Gln Ala Lys Ser Leu Leu Lys

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370

375

380

Asn Glu Asn Thr Arg Asn Glu Cys Ser Gly Glu Ile Leu Asn Asn Cys

385

390

395

400

10

Cys Val Met Glu Tyr His Gln Ala Thr Gly Thr Leu Ser Ala His Phe

405

410

415

15

Arg Asn Met Ser Leu Lys Arg Ile Lys Arg Ala Asp Arg Arg Gly Ala

420

425

430

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Glu Ser Val Thr Glu Glu Lys Phe Thr Val Leu Phe Glu Ser Gln Phe

435

440

445

Ser Val Gly Ser Asn Glu Leu Val Phe Gln Val Lys Thr Leu Ser Leu

25

450

455

460

Pro Val Val Val Ile Val His Gly Ser Gln Asp His Asn Ala Thr Ala

465

470

475

480

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Thr Val Leu Trp Asp Asn Ala Phe Ala Glu Pro Gly Arg Val Pro Phe

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10 Ala Val Pro Asp Lys Val Leu Trp Pro Gln Leu Cys Glu Ala Leu Asn

500

505

510

Met Lys Phe Lys Ala Glu Val Gln Ser Asn Arg Gly Leu Thr Lys Glu

15

515

520

525

Asn Leu Val Phe Leu Ala Gln Lys Leu Phe Asn Ile Ser Ser Asn His

530

535

540

20

Leu Glu Asp Tyr Asn Ser Met Ser Val Ser Trp Ser Gln Phe Asn Arg

545

550

555

560

25

Glu Asn Leu Pro Gly Trp Asn Tyr Thr Phe Trp Gln Trp Phe Asp Gly

565

570

575

Val Met Glu Val Leu Lys Lys His His Lys Pro His Trp Asn Asp Gly

5

580

585

590

Ala Ile Leu Gly Phe Val Asn Lys Gln Gln Ala His Asp Leu Leu Ile

595

600

605

10

Asn Lys Pro Asp Gly Thr Phe Leu Leu Arg Phe Ser Asp Ser Glu Ile

610

615

620

15

Gly Gly Ile Thr Ile Ala Trp Lys Phe Asp Ser Pro Asp Arg Asn Leu

625

630

635

640

20

Trp Asn Leu Lys Pro Phe Thr Thr Arg Asp Phe Ser Ile Arg Ser Leu

645

650

655

Ala Asp Arg Leu Gly Asp Leu Asn Tyr Leu Ile Tyr Val Phe Pro Asp

25

660

665

670

Arg Pro Lys Asp Glu Val Phe Ala Lys Tyr Tyr Thr Pro Val Leu Ala

675

680

685

5

Lys Ala Val Asp Gly Tyr Val Lys Pro Gln Ile Lys Gln Val Val Pro

690

695

700

10 Glu Phe Val Asn Ala Phe Thr Asp Ala Gly Ala Ser Ala Thr Tyr Met

705

710

715

720

Asp Gln Ala Pro Ser Pro Val Val Cys Pro Gln Pro His Tyr Asn Met

15

725

730

735

Tyr Pro Pro Asn Pro Asp Pro Val Leu Asp Gln Asp Gly Glu Phe Asp

740

745

750

20

Leu Asp Glu Ser Met Asp Val Ala Arg His Val Glu Glu Leu Leu Arg

755

760

765

25

Arg Pro Met Asp Ser Leu Asp Ala Arg Leu Ser Pro Pro Ala Gly Leu

770

775

780

Phe Thr Ser Ala Arg Ser Ser Leu Ser

5

785

790